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THE TANNIN OF CERIOPS CANDOLLEANA.

By Henry Trimble.

Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy. No. 170.

Having received two samples of the bark from this member of the mangrove group, which had been collected in widely separated localities in India, it was thought that an investigation of the principal constituent, tannin, might prove of interest.

One sample was received from A. E. Wild, Conservator of Forests, Bengal; it was collected in that locality in February. The other sample was sent from Singapore, and was collected there in November; it was forwarded to me by H. N. Ridley, of the Botanic Gardens at that place.[1]

Ceriops Candolleana, like many other members of the Rhizoporaceæ, is found in nearly all the low muddy shores of India, and the Andaman Islands. It is known under the vernacular names of Kirrari, Gorán, Madá and Tengah, according to the locality in which it grows. It is a small, evergreen tree, with dark red bark and hard red wood. The pores of the wood are very small, and the medullary rays very fine, slightly wavy and equidistant. Pores joined by fine, wavy, interrupted, concentric bands.

The bark is of a deep reddish-brown color, and is covered on the outer surface with numerous conspicuous lenticels. It yields a

[1] To both Mr. Wild and Mr. Ridley the author is under obligations for other valuable samples.

deep port wine coloring to water, and contains large quantities of both coloring matter and tannin. On these two substances depends the use of the bark for both dyeing and tanning. It is by far the most valuable one of the mangrove barks for tanning. The claim is made[2] that it imparts a fine red color to leather. It may be said, in regard to this, however, that tanners usually object to a reddish color imparted by tanning materials, and the objection heretofore to all mangrove barks has been the tendency they have to produce a red color and a soft leather. Another real objection to the mangrove extract sent from a tropical climate has been noted by Mr. Ridley, who says the stuff has generally been so abominably prepared that no one will look at it. At the present time attempts are being made to manufacture a good quality of extract in southern India and Borneo for export.[3]

The wood is used in the province of Sind for the knees of boats and several other purposes, and in Lower Bengal for house posts and for firewood.

Each of the two samples yielded the following percentages of moisture, ash and tannin:

	Moisture.	Ash in absolutely dry sample.	Tannin in original sample.	Tannin in absolutely dry sample.
Sample from Bengal . . .	13·70	5·83	27·24	31·56
Sample from Singapore . .	13·34	10·60	20·00	23·07

It will be seen from the tannin percentages that Ceriops well deserves the reputation it has for being the most valuable one of the mangroves. The per cent. of tannin is more than is usually found in barks, and is perhaps only equalled by the wattle barks of Australia. The differences of both tannin and ash in the above samples are considerable, but not more than is found in our oaks when collected at different seasons of the year.

A quantity of tannin was prepared from the Bengal sample. It was thoroughly purified and submitted to elementary analysis, yielding the following percentage results:

Carbon	61·13
Hydrogen	5·29

These figures, with the reactions towards iron salts, bromine water and calcium hydrate, prove it to belong in the class of oak bark tannins.

[2] Watt, *Dictionary of the Economic Products of India*, Vol. II, p. 261.

[3] *Kew Bulletin* for February and March, 1897, contains a report by Professor Hummel on the value of Ceriops bark for dyeing purposes.

THE CAMPHOR TREE.[1]

(*Cinnamomum camphora*, Nees & Eberm.)

By Lyster H. Dewey.

DESCRIPTION.

The camphor tree is a broad-leaved evergreen, related to the red bay and to the sassafras of the United States. In its native habitat it attains a height of 60 to 100 feet, with wide-spreading branches and a trunk 20 to 40 inches in diameter. Its general habit is similar to that of the basswood. The leaves are broadly lanceolate in

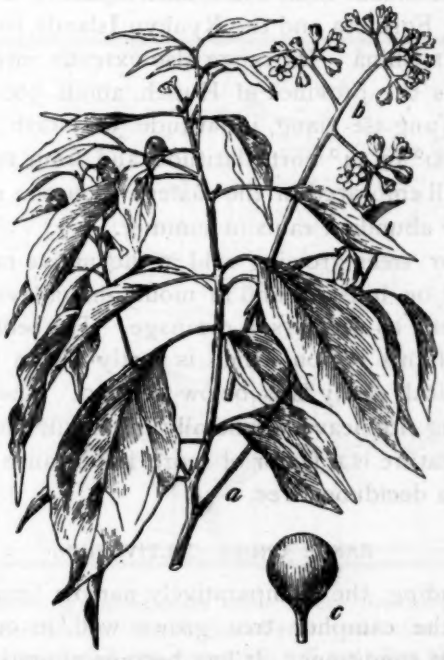


Fig. 1.—Camphor tree: *a*, young, leafy shoot, scale one-third; *b*, flower cluster, life size; *c*, fruit, life size.

form, with acuminate points at both base and apex, of a light green color, smooth and shining above and whitish, or glaucous, on the under surface. The lower pair of lateral veins are more prominent than the others, but the leaves are not as distinctly three-nerved as

[1] United States Department of Agriculture, Division of Botany. Circular No. 12.

those of the cinnamon and many other species of the genus. The small white or greenish-white flowers (*Fig. 1, b*) are borne in axillary racemes from February to April, on shoots of the previous season, and are followed in October by berry-like, one-seeded fruits about 3/8 inch in diameter (*Fig. 1, c*). The fruiting pedicels terminate in a saucer-shaped disk, persisting after the mature fruit has fallen.

NATIVE RANGE.

The camphor tree is native in the coast countries of Eastern Asia from Cochin China nearly to the mouth of the Yang-tse-kiang, and on the adjacent islands from the southern part of the Japanese Empire, including Formosa and the Ryukyu Islands, to Hainan, off the coast of Cochin China. Its range also extends into the interior of China as far as the province of Hupeh, about 500 miles from the coast on the Yang-tse-kiang, in latitude 30° north. This area, extending from 10° to 34° north latitude, and from 105° to 130° east longitude, is all embraced in the eastern monsoon region, which is remarkable for abundant rains in summer.

The camphor trees growing wild in the native range are usually most abundant on hillsides and in mountain valleys, where there is good atmospheric as well as soil drainage. The temperature in the greater part of this region, which is partly within the tropics and partly subtropical, rarely falls below freezing. The tree is an evergreen, changing its leaves generally in April, and therefore the winter temperature is a factor of more importance than would be the case with a deciduous tree.

RANGE UNDER CULTIVATION.

Notwithstanding the comparatively narrow limits of its natural environment, the camphor tree grows well in cultivation under widely different conditions. It has become abundantly naturalized in Madagascar. It flourishes at Buenos Ayres. It thrives in Egypt, in the Canary Islands, in southeastern France, and in the San Joaquin Valley, in California, where the summers are hot and dry. Large trees, at least 200 years old, are growing in the temple courts at Tokyo, where they are subject to a winter of seventy to eighty nights of frost, with an occasional minimum temperature as low as 12° to 16° F. The most northern localities in the United States, so far as known at this Department, where the camphor tree has

been grown successfully out of doors, are Charleston and Summerville, in South Carolina, Augusta, Ga., and Oakland, Cal.

At Charleston, Summerville and Augusta the trees have withstood a minimum temperature of 15° F., but they have been protected by surrounding trees and buildings. At Mobile, Ala., the trees have grown and fruited in protected situations, while in exposed places they have been repeatedly destroyed by frosts. While the camphor tree will grow on almost any soil that is not too wet, it does best on a well-drained sandy or loamy soil, and it responds remarkably well to the application of fertilizers. Its growth is comparatively slow on sterile soils, but under favorable conditions it

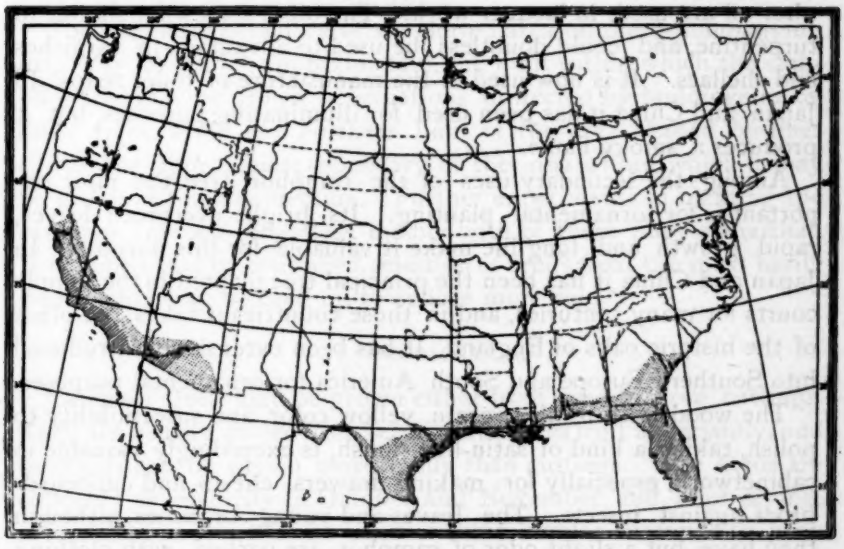


Fig. 2.—Map showing approximate areas where the camphor tree may be grown in the United States. In the dotted area protection from cold will be required. In the line-shaded area protection will not often be required, except in exposed situations and on the mountains of California.

sometimes grows very rapidly. An instance is recorded of a camphor tree in Italy a foot in diameter and 90 feet high, eight years from the seed. Under ordinary conditions, however, such a girth is not often attained in less than twenty-five years, and such a height is rarely attained in a century. Under favorable conditions an average of 30 feet in height, with trunks 6 to 8 inches in diameter at the base, may be expected in trees ten years from the seed.

USES OF THE TREE AND ITS PRODUCTS.

The principal commercial uses of the camphor tree are for the production of camphor gum and camphor oil. Camphor gum is employed extensively in medicine. It enters into the composition of many kinds of liniments for external application. For liniment it is used especially in combination with olive oil. It is taken internally for hysteria, nervousness, nervous headaches, diarrhœa and diseases affecting the alimentary canal. It is a specific in cases of typhoid fever and cholera. Camphor fumes have been used with success in cases of asthma. It has been used very extensively to keep insects out of furs, woollens, etc. In Japan camphor and camphor oil are used in lacquer work. The oil is somewhat similar to turpentine, and could doubtless be used to advantage in varnishes and shellacs. It is now used in the manufacture of toilet soaps. In Japan and China it has been used for illuminating purposes, but it produces a smoky flame.

Among the secondary uses of the camphor tree the most important is for ornamental planting. Its bright evergreen leaves, rapid growth and long life make it valuable for this purpose. In Japan and China it has been the principal tree planted in the temple courts for many centuries, and in those countries it takes the place of the historic oaks of England. It has been extensively introduced into Southern Europe and South America for ornamental purposes.

The wood, with its close grain, yellow color, and susceptibility to polish, taking a kind of satin-like finish, is exceedingly valuable in cabinetwork, especially for making drawers, chests and cupboards proof against insects. The leaves and young branches, although they have but a slight odor of camphor, are packed with clothing or scattered about unused rooms to guard against insects.

The tree produces an abundance of berry-like fruits, which are used in Japan and China to make a kind of tallow. The fruits are greedily eaten by chickens and birds, especially mocking birds, which often select camphor trees for nesting places.

CONDITIONS OF SUCCESSFUL CULTIVATION.

For most of the secondary purposes, the camphor tree may well be cultivated wherever it can be made to live; but for the distillation of gum and oil with a commercial view, and for the production of wood for cabinet purposes, it must be grown under the most

favorable conditions. The minimum winter temperature should not be below 20° F., and this minimum should be of rare occurrence. The soil, preferably sandy and well drained, should be irrigated unless there are abundant rains. Fifty inches of water during the warm growing season is desirable, and much more may well be used where the air is very dry.

An abundance of plant food, rich in nitrogen, is required for rapid growth; but the kind of fertilizer that can be most profitably applied will vary according to the character of the soil in each locality. In the absence of definite information in this regard, the kind of fertilizer producing most rapid growth of wood in the orange or in other fruit trees may be taken as an index.

The northern boundary of the dotted area on the accompanying map (*Fig. 2*) marks, approximately, the limit within which the camphor tree may be grown in situations protected by buildings or by other trees, while the northern limit of the area shaded by lines marks the approximate boundary of the area within which it may be grown without protection. Further experiments in planting the camphor tree will doubtless modify both of these lines somewhat. It is hoped that by continued selection of seeds from the most hardy trees plants may be bred up to endure more cold.

PROPAGATION.

Camphor trees may be grown either from seed or from cuttings. They are usually grown from seed, as the trees fruit abundantly, and seedlings can be grown more easily than cuttings. The seeds are collected at maturity in October and November, and, after drying, are packed in sharp white sand or some similar material to keep them fresh until the time of planting in spring. About the last of March they are sown in drills in the seed bed.

The soil of the seed bed should be a good sandy loam mixed with about one-third leaf mould. The seed bed should be kept moist, but not too wet, and should be shaded from the direct rays of the sun if the weather is warm. The best soil temperature for germinating camphor seeds is from 70° to 75° F. The temperature of the atmosphere may be 10 degrees higher. The seedlings will grow well at higher temperatures, but are likely to lack vigor and hardiness.

The seedlings may be grown in pots, which will facilitate trans-

planting at any time, or they may be transplanted in nursery rows early in April when one year old. Plants two years old are generally regarded as best for final planting. At this age they vary from 20 to 40 inches in height.

PLANTING AND CULTIVATION.

When set out for ornamental purposes, the camphor tree may be expected to grow, in favorable situations, about as rapidly as a Le Conte pear, and to require about as much room. In Japan, where the law requires that a new tree shall be set out for every one cut, they are not generally set in straight orchard rows, but cultivation there is performed almost exclusively by hand labor. There are no records showing results of regular orchard planting, hence the distances at which trees should be planted must be determined by the size and form of the trees and the methods of cultivation, and of procuring the gum. They may be set closely in rows about 10 feet apart, and alternate rows cut and reset every five years, thus producing bush-like plants of ten years' growth. They may be planted in checks 10 feet square, and alternate trees cut every ten or twelve years, or they may be planted in larger checks, and all of the trees be cut at the age of fifteen or twenty years.

There are not sufficient data obtainable upon which to base definite statements as to the best methods of planting or the age at which the trees may be cut with greatest profit for the production of gum. A recent English consular report from Japan states that "although hitherto the youngest wood from which camphor was extracted was about seventy to eighty years old, it is expected that under the present scientific management the trees will give equally good results after twenty-five or thirty years." Camphor of good quality has been produced in Florida from the leaves and twigs of trees less than twenty years old, 1 pound of crude gum being obtained from seventy-seven pounds of leaves and twigs.

The trees will endure severe pruning with little apparent injury. One-third of the leaves and young shoots may be removed at one time without materially checking the growth of the tree. The largest proportion of camphor is contained in the older, larger roots; the trunk, limbs, twigs and leaves containing successively a decreasing proportion. When the camphor tree is killed nearly to the ground by frost it sends up vigorous shoots from the base. It may

be expected to do the same when cut, especially if cut late in the fall. Experiments are needed to determine whether this growth may be depended upon, or whether it will be more profitable to dig out the larger roots and set out new seedlings.

DISTILLATION OF CAMPHOR IN JAPAN.

In the native forests in Formosa, Fukien and Japan camphor is distilled almost exclusively from the wood of the trunks, roots and larger branches. The work is performed by hand labor, and the methods employed seem rather crude. Different methods of distillation are employed in different districts, but those in use in the province of Tosa, in Japan, appear to be the most skilful. The camphor trees are felled, and the trunk, larger limbs, and sometimes the roots, are cut into chips by hand labor with a sharp concave adz.

The fresh chips are placed in a wooden tub about 40 inches high and 20 inches in diameter at the base, tapering toward the top like an old-fashioned churn. The perforated bottom of the tub fits tightly over an iron pan of water on a furnace of masonry. The tub has a tight-fitting cover, which may be removed to put in the chips. It is surrounded by a layer of earth about 6 inches thick to aid in retaining a uniform temperature. A bamboo tube extends from near the top of the tub into the condenser. This consists of two wooden tubs of different sizes, the larger one right side up, kept about two-thirds full of water from a continuous stream which runs out of a hole in one side. The smaller one is inverted with its edges below the water, forming an air-tight chamber. This air chamber is kept cool by the water falling on the top and running down over the sides. The upper part of the air chamber is sometimes filled with clean rice straw, on which the camphor crystallizes, while the oil drips down and collects on the surface of the water. In some cases the camphor gum and oil are allowed to collect together on the surface of the water, and are afterward separated by filtration through rice straw or by pressure.

About twelve hours are required for distilling a tubful by this method. Then the chips are removed and dried for use in the furnace, and a new charge is put in. At the same time the camphor and oil are removed from the condenser. By this method 20 to 40 pounds of chips are required for 1 pound of crude camphor gum.

The principles generally held to be essential in distilling camphor of good quality are: (1) The heat must be uniform and not too great, producing a steady supply of steam; (2) the steam, after liberating the camphor, must not come in contact with metal, that is, the tub and condensing apparatus must be of wood.

SUGGESTED IMPROVEMENTS.

Many improvements upon the methods described can doubtless be made, tending both to a reduction in cost and an increase in the proportion of crude gum obtained. Instead of an adz wielded by hand labor a machine similar to the "hog" used for grinding up waste slabs in saw-mills may be used to reduce camphor limbs to the requisite fineness for distillation. Better distilling apparatus can probably be devised. Thermometers may be introduced to determine the heat in the distilling tub, and the furnace may be so arranged as to permit better control and greater economy in fuel. Camphor and camphor oil are both slightly soluble in water, and the condensing chamber should be improved so as to recover the product that is being constantly carried off in the running stream which cools the chamber.

OUTLOOK FOR FUTURE MARKET.

The consumption of camphor in this country, as measured by the importations, has been decreasing during the past ten years, while the price has been increasing, as indicated by the following table:

IMPORTS, VALUES AND APPROXIMATE VALUES PER POUND OF CAMPHOR FOR YEARS ENDED JUNE 30, 1887–1896, AND FOR NINE MONTHS ENDED MARCH 31, 1897.

	Crude Camphor—Duty Free.			Refined Camphor—Dutiable.			
Years.	Quantities.	Values.	Value per pound.	Quantities.	Values.	Value per pound.	Rates of Duty.
	Pounds.			*Pounds.*			*Per lb.*
1887	2,873,184	$352,861.00	$0.12	307	$45.00	$0.15	5 cents.
1888	2,779,719	304,460.00	.11	61	7.77	.13	do
1889	1,974,500	293,031.44	.15	72	10.50	.15	do
1890	2,061,370	421,385.00	.20	87	37.75	.43	do
1891	1,666,074	468,025.00	.28	63	21.23	.33	4 cents.
1892	1,955,787	447,634.00	.23	56,820	17,361.00	.31	do
1893	1,723,425	446,548.00	.26	156,291	51,229.33	.33	do
1894	1,323,932	309,407.00	.23	137,882	44,233.00	.32	do
1895	1,509,713	284,958.00	.19	271,164	83,382.00	.31	(*)
1896	943,205	328,457.00	.35	153,912	68,785.00	.45	(*)
For 9 months, March 31, 1897 (latest reports obtainable)	855,284	207,137.77	.24	155,027	52,811.00	.34	(*)

* Ten per cent. ad valorem.

The Tariff Act approved July 27, 1897, imposes a duty of 6 cents per pound on refined camphor and leaves crude camphor on the free list, as heretofore.

There has been an increase in importations of refined camphor, due to improved methods of refining and packing in Japan and to changes in the tariff; but this increase has been much more than counter-balanced by the decrease in importations of crude camphor.

The decrease may be attributed to the following causes: (1) The exhaustion of the supply of the available camphor trees near the shipping ports; (2) the governmental restrictions on the trade in camphor in Formosa: (3) government taxes on the exportation of camphor from Formosa; (4) hostilities and wanton destruction of camphor stills by the natives in Formosa; (5) disturbances in the camphor-producing district of China; (6) the China-Japan war; (7) attempts by speculators to corner the market.

These causes have increased the price of camphor, and this in turn has led to the introduction of substitutes. Menthol and other peppermint derivatives or compounds, carbolic acid and its derivatives, naphthalin, formalin and insect powder are now used for various purposes where camphor was formerly employed. Camphor has been manufactured artificially at a cost leaving a margin of profit at present prices. It is, therefore, apparent that if the production of camphor from the trees is to be carried on with profit in this country, and the industry increased to any considerable extent, the price of camphor must be reduced to compete with the prices of substitutes now taking its place.

Camphor has been obtained from several other plants not at all related to the ordinary camphor tree; but only two kinds, Borneo camphor and Blumea camphor, are of any importance commercially.

Borneo camphor is obtained from the camphor tree of Borneo and Sumatra, *Dryobalanops aromatica*. It is deposited in clefts and hollows in the wood, and has simply to be taken out. This camphor is comparatively rare and the supply is consumed almost exclusively in China, where it is valued at from thirty to ninety times as much as ordinary camphor.

Blumea camphor is obtained by distillation from *Blumea balsamifera*, a shrub growing in Burmah and the Malay Peninsula. This is usually refined in Canton, whence about 10,000 pounds are ex-

ported annually. The source of this supply is abundant, and as the industry develops it is likely to enter more into competition with ordinary camphor. Neither of these plants can be grown in the United States, except possibly in southern Florida, without protection against cold.

Approved:

JAMES WILSON,
Secretary of Agriculture.

WASHINGTON, D. C., August 12, 1897.

ON THE THERAPEUTIC PROPERTIES OF ALCOHOL AND THE REASONS WHY THE FERMENTED AND DISTILLED LIQUORS USED AS BEVERAGES SHOULD NOT BE RECOGNIZED IN THE PHARMACOPŒIA AS MEDICINAL AGENTS.[1]

BY N. S. DAVIS, A.M., M.D., LL.D.

Pure ethyl alcohol, undiluted, is regarded by all chemists and intelligent physicians as an active poison, rapidly destructive of both vegetable and animal life whenever brought into contact with either. The presence of absolute alcohol in contact with any living tissue immediately arrests all natural metabolic and vital processes in such tissue, and causes it to become corrugated or shrunken and dead. Swallowing absolute alcohol, undiluted, as quickly destroys the vitality of the membranes of the mouth, throat and stomach, and kills the individual, as does pure carbolic acid. Consequently, alcohol, in its pure and undiluted state, is not capable of being used as a medicine, but when largely diluted with water, as it is in all the fermented and distilled beverages, its direct corrosive or corrugating effect upon the membranes it comes in contact with is so much diminished that it is capable of being absorbed and conveyed in the blood to all parts of living body. In this diluted condition, therefore, it early began to be used both as a medicine and as a popular drink; and as the most readily appreciable effect was to diminish the

[1] Presented to the Section on Materia Medica, Pharmacy and Therapeutics at the Forty-eighth Annual Meeting of the American Medical Association, held at Philadelphia, June 1-4, 1897, and taken from the *Journal of the American Medical Association*, of August 21, 1897.

individual's consciousness of impressions, not only from without, but also from within, it soon came to be regarded as a universal tonic and restorative. Its supposed tonic and restorative effects were based wholly on the sensations and movements of patients or individuals under the influence of moderate doses, for it was soon demonstrated that large doses directly diminished strength, sensibility and action. But when, under the influence of moderate doses, the patient said he felt less weak or weary, felt the sensation of cold or heat as painless, felt lighter or more buoyant, and his heart was found to beat faster, it was perfectly natural for both physician and patient to think the alcohol was acting as a tonic or stimulant and general restorative. It was not until the advancement in analytic chemistry and the physiology of all parts of the nerve structures of man, coupled with the researches in physics and biology of the last half century, that we have had it in our power to prove the incorrectness of these conclusions founded on the sensations and actions of the patient under its influence. The more recent chemico-physiologic researches have shown more clearly the composition of the blood and the various tissues of the body, and especially the existence and functions of the hæmoglobin, leucocytes and other corpuscular elements of both blood and tissues, and the part each plays in the reception and internal distribution of oxygen, with its effects on all the metabolic changes in living bodies. By the same class of researches it is shown that alcohol, diluted with water and taken into the stomach, is rapidly absorbed by the capillaries and is conveyed in the blood to every tissue in the body, and by its presence retards the natural metabolic changes, lessens the processes of oxidation and elimination, diminishes nerve sensibility and, when repeated from day to day, induces cell and tissue degeneration. By the more recent studies in the anatomy and physiology of the several parts of the nervous system, it has been shown not only that the action of the heart and the movement of the blood in the vessels are directly under the control of the cardiac and vasomotor nerves, some of the fibres of which are exciters of action, while others are inhibitors, by which uniformity and harmony is maintained in the circulation of the blood, but also that our voluntary movements and sensations are manifested by the cerebro-spinal nerves, having their exciters and inhibitors by which we are enabled to co-ordinate muscular contractions and relaxations in executing all complex movements, and

equally so it is that our mental actions, manifested through the convolutions of the brain, are regulated by exciters and inhibitors. Every individual whose brain is in its normal condition has frequent sensations, impulses or exciters of mental actions which he promptly inhibits or disregards. Indeed, it is on the proper development of this mental inhibition that every person's self-control and sense of propriety depends.

If it is true, as has been already stated, that alcohol, when taken into the living system in large doses, is an active poison, quickly destroying animal life, and in smaller doses is an anæsthetic, directly diminishing cerebral sensibility and mental consciousness and retarding all metabolic changes, both in the blood and tissues, it follows as a logical and necessary inference that, if administered as medicine, it should be done with the same care and exactness in regard to purity, dose and time that we exercise in prescribing morphine, quinine, aconite, arsenic or any other active drug. This cannot be done by using any of the various fermented and distilled liquors ordered either from drug stores or liquor dealers, since they are kept at no uniform standard of either strength or purity. The present Pharmacopœia recognizes as medicines, vinum or wine, spiritus frumenti or whiskey, and spiritus vini gallici or brandy, but does not give a definite official standard of alcoholic strength for either of them. Neither does it give any reliable and readily available tests by which the strength and purity of the articles can be determined by the ordinary practitioner of medicine. Repeated analyses have shown that the amount of alcohol in different samples of wine varies from 6 to 25 per cent.; in whiskey, from 35 to 50 per cent., and in brandy, from 40 to 60 per cent. Such variations in the strength of any other medicine would quickly cause its standard to be corrected, or its exclusion from the official list of drugs. As alcohol is the only important therapeutic agent in all these liquors, why not let pure alcohol of fixed strength be officially recognized to the exclusion of all the varieties of both fermented and distilled drinks? Then every practitioner desiring to give alcohol as a remedy could order it with any desired degree of dilution with water, and he would know what his patient was getting and how much, and the pharmacist would no longer need to pay for a license to sell liquors, or to be classed with the ordinary dealers in such beverages. One of the most important improvements in modern pharmacology consists in the separation of

the active therapeutic agents from the more complex or crude drugs, and thereby enables the physician to administer them with far greater convenience and certainty. Very few intelligent physicians of the present day would think of prescribing crude opium when they desired to produce only the anodyne effects of the morphine it contained, certainly not without knowing what per cent. of morphine would be in the crude drug. Why, then, should he prescribe the uncertain mixtures called beer, wine, whiskey or brandy, when his sole object is to obtain the therapeutic effects of alcohol? If it is claimed that these several fermented and distilled liquors contain other therapeutic agents in addition to the alcohol, we answer that, so far as any such agents exist, their proportionate quantity and quality are far more variable and uncertain than is their per cent. of alcohol. Almost the only constituents found in whiskey and brandy, besides the alcohol and water, are very variable quantities of fusel oil, tannin and, in very old specimens, a trace of some ethereal substance to which connoisseurs attribute the special *bouquet.* So far from adding to the therapeutic value, the first two substances are regarded as very undesirable impurities, and the last named has never been isolated in sufficient quantity to have its medical qualities tried. Much has been said and written concerning valuable nutritive constituents in the different varieties of wine, but the numerous analyses on record show only very variable quantities of fecula, saccharine matter, tannin, some vegetable acids and potassium salts, in addition to the alcohol and water. Of these extra ingredients the fecula and saccharine matter are the only ones that could be classed as nutritive or capable of being converted into any natural element of the blood or tissues of the body.

The quantity of these in any variety of wine is so limited that it would require several barrels of the wine to furnish the equivalent of a pound of bread. Consequently, it would be far more economic, as well as more scientifically accurate, for every physician to prescribe such doses of pure alcohol and water to be given with such quantity of sugar, milk or meat broth, as he thought his patient might need. The physician who cannot do this, and thereby accurately adjust the proportion of all the elements his patient may need, has certainly received a very defective professional education. It would be a long and very important step in advance, both in the interests of scientific accuracy and of humanity, if all physicians,

when they thought alcohol was needed, would prescribe it in the manner just indicated, and if in the next revision of the Pharmacopœia, only alcohol of standard strength was retained to the exclusion of all fermented and distilled liquors. If these changes were adopted and carried into general practice, the result would be a more complete separation of both pharmacist and physician from connection with, or responsibility for, the general traffic in and uses of the various alcoholic liquors in popular use.

STROPHANTHUS NICHOLSONI—A NEW SPECIES.[1]

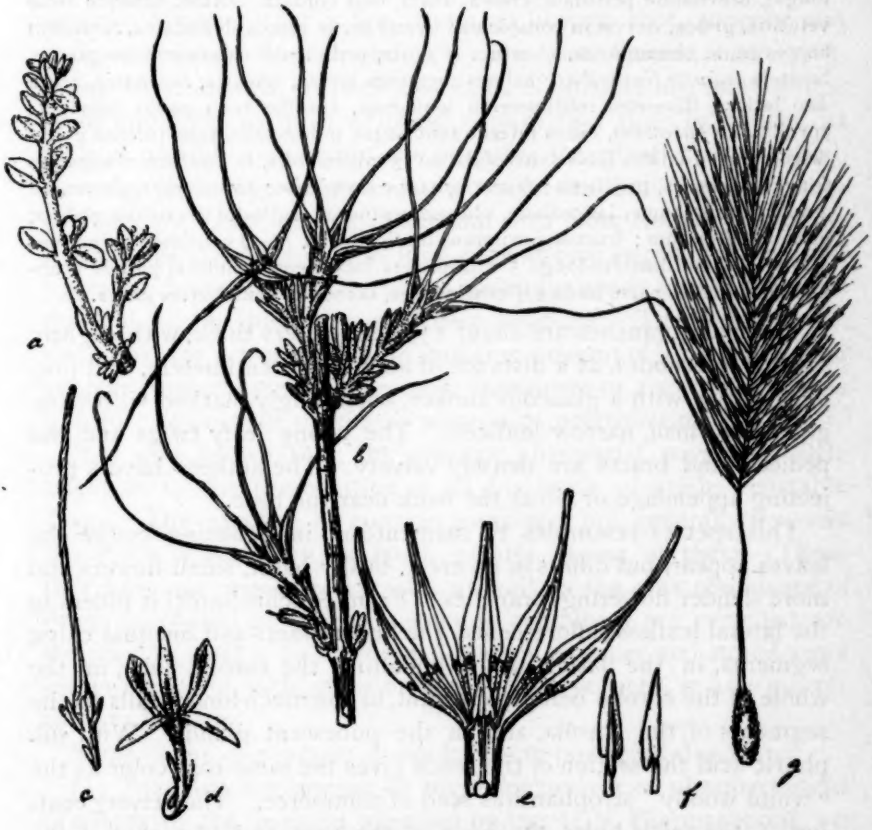
By E. M. Holmes.

For some years past I have been endeavoring to obtain herbarium specimens in flower and fruit of the species yielding the kombe seed of commerce, and the "white woolly" strophanthus seeds imported from the same district, but hitherto without success. Dr. T. G. Nicholson, who has lately returned from Central Africa, kindly promised to endeavor to obtain specimens, and has brought back flowers and fruit of a strophanthus, the seeds of which appear to be identical with those of the "white woolly" strophanthus. The plant proves to be a new species hitherto undescribed. Dr. Nicholson has given me the following description of the plant: It is a small bush or shrub, about 3 or 4 feet high, having the habit of growth of the flowering currant (Ribes sanguineum, Pursh.), but the main branches curve slightly outwards, and the slender twigs are patent at an obtuse angle.

It grows in alluvial plains at the base of granite hills, intersected by quartz veins. These plains are at an altitude of about 2,200 feet above sea-level. The ground is sodden from the middle of November until the beginning of April. It is sparsely covered with bush, and there is very little shade where the strophanthus grows. The temperature averages about 105° F. in the sun and 50° F. in the night. The specimens in flower were gathered at the end of October. There are the pods of the previous year opening on the bush at the same time that the flowers are in blossom, and in December the flowers are over and the seeds scattered. At the time the plant flowers there are no leaves formed, or they are only very slightly developed.

[1] *Pharmaceutical Journal*, September 4, 1897.

The general color of the flowers is of a pink hue, with a tinge of dusky fawn. The throat of the corolla is yellow, with dark purple lines and spots. The thread-like corolla segments or "streamers" are of a pinkish purple. The whole corolla in withering fades to yellow, but does not readily fall off. The fruit is of a purplish plum



Strophanthus Nicholsoni, n. sp.—*a*, leafy twig with leaves undeveloped; *b*, leafless inflorescence; *c*, unopened flower; *d*, calyx; *e*, corolla, with tails removed; *f*, anthers; *g*, seed; *a*, *b*, *c*, *g*, about two-thirds natural size; *d*, *e*, *f*, enlarged.

color, and marked with linear oval lenticels, some of which are nearly 1 centimeter long. The district in which he found the plant extends from Lusengasia, in the Senega country, in a southwest direction to the Loangwa River.

The Ozimba natives would not admit that they used it as an

arrow poison, but stated that it was so used by the Chipéta people. The plant is most nearly allied to S. schuchardti, Pax., and may be characterized by the following description:

Strophanthus Nicholsoni, n. sp.—Frutex dumosus, ramis griseofuscis, vetustis glabris, novellis dense tomentosio; folia (juniora solum visa, ad 1 centimeter longa), brevissime petrolata, crassa, ovata, basi cordata, obtusa, utraque facie velutina, grisea, nervis in conspicuis; cymæ secus ramos denudatos, ramulum abbreviatum terminantes, abortu 1–3 floræ, pedunculo calycem subæquante, bracteis *auguste linearibus;* calycis segmenta erecta, linearia, *inequalia*, acuta duo latiora, diametro millimetrum æquantes, corollæ tubo paulo breviora; corolla *tota pubescens*, fauce interno tenuissime pubescente, tubo inferne cylindrico, fauce dilatato, lobis lanceolatis ad 15 millimeters, in caudam elongatam 6–10 centimeters, productis; faucis *squamæ tenuissime pubescentes*, parvæ, ad 2 millimeters longæ, lanceolatæ, obtusæ, antheræ sagittatæ filamentis glabris; ovarium hirsutum; fructus purpureus lenticellosus, 14–27 centimeters longus; semina 1½ centimeters longa 5 millimeters lata, dense velutina, pallide brunneo alba, aristæ parte nuda 4½ centimeters, comosa 6 centimeters longa.

The main branches are about 1½ centimeters thick, with slightly swollen internodes, at a distance of about 4–7 centimeters, dull purplish-brown with a glaucous surface, but strongly marked with elongated brownish, narrow lenticels. The young leafy twigs and the pedicels and bracts are densely velvety. The anthers have a projecting appendage or rib at the back near the base.

This species resembles S. sarmentosus in flowering before the leaves appear, but differs in its erect, bushy habit, small flowers and more slender flowering branches. From S. schuchardti it differs in the lateral leafless inflorescence, the linear bracts and unequal calyx segments, in the latter nearly equalling the corolla tube, in the whole of the corolla being pubescent, in the much longer tails to the segments of the corolla, and in the pubescent glands. With sulphuric acid the section of the seeds gives the same rose color as the "white woolly" strophanthus seed of commerce. The velvety coating of the seeds hides the base of the awn, and, like that of the "white woolly" strophanthus seeds, the hairs look white when their bases are presented to the light, and brownish-fawn color when their apices are turned to the light. The average measurements of the seeds are the same.

An adulteration of magnesium sulphate with zinc sulphate has been observed by P. A. Lamanna, *Boll. Chim. Farm.*, 36, 198. The zinc salt may be detected by the addition of one drop of solution of potassium ferricyanide to a solution of the suspected salt, when, if zinc is present, a brownish-yellow precipitate is produced.

EXAMINATION OF POWDERED VEGETABLE DRUGS.

By Henry Kræmer.

Powdered drugs and "pressed herbs" will, no doubt, at a not very distant day, be the form in which most of the vegetable drugs will be bought and sold by the apothecary. It seems reasonable to suppose, however, that a few drugs, as licorice root, slippery elm bark, chamomile flowers, rhubarb, orris root, Canada snake root, senna leaves, manna, etc., will always be obtainable in a more or less crude condition, as most of these require that they be broken as little as possible for some of the purposes for which they are used. But even these may be ground and compressed into forms, as "rhubarb fingers," that may be in keeping with more elegant pharmacy. Some of the manufacturers, at least, of powdered vegetable drugs and "pressed herbs" have overcome probably nearly every objection that might be raised against their products. They have done, moreover, the art of healing an immense amount of good, inasmuch as their products are sold in proper containers or are wrapped so as to insure against the maximum amount of deterioration.

It is well known that the average pharmacist pays very little attention to the preservation of all his stock of crude vegetable drugs. The number of suitable containers are generally few, and the stock is necessarily in much greater excess of these. Those that have no proper receptacles, as well as the over-abundance of drugs purchased for which no suitable containers are provided, are wrapped in what is by no means impervious paper and stored away either on top of each other or side by side, or both, in an "out-of-the-way" place.

Some of the *advantages in the buying* of powdered drugs are:

(1) That they are ground by the manufacturer of pharmaceutical products to the fineness specified by the U. S. Pharmacopœia, or, when the drug is not official, to that which is generally used.

(2) The pharmacist is saved the expense for apparatus, as a drug-mill, sieves, etc.

(3) He furthermore saves time in grinding the crude drugs or attending to the same.

(4) The powdered drugs which he purchases are in impervious containers, and of such a form that he does not hesitate to place them on his shelves or his "out-of-the-way" place, be it the hottest part of his store (over the cases) or the most humid part.

(5) No additional expense may be felt by the pharmacist for securing other containers than those in which his products come to him.

Some of the *disadvantages in the purchasing* of powdered drugs are:

(1) That the drug in this condition costs from 5 to 50 per cent. more.

(2) The apprentice does not obtain the kind of practical experience in grinding drugs that will be always of inestimable value to him in determining either their identity or quality.

(3) The product which has been ground by someone else is likely to be more uncertain than one ground by the pharmacist himself from crude drugs of which he can so readily test the quality.

(4) There is at present no easy method for the average pharmacist to determine the purity of the powdered drugs he purchases.

Now, some pharmacists have the idea that a large sum of money must be expended in order to be able to grind one's own drugs—that, for instance, steam-power is necessary, an expensive mill must be provided and a special room set apart for doing this kind of work. The fact of the matter is that such an expensive and elaborate plant is impracticable as well as unnecessary. Comparatively little money need be expended to purchase a good hand-mill and the necessary sieves. With but very little outlay, the retail pharmacist can grind his own drugs and overcome the disadvantages above noted. It is not the object of this paper, however, to discourage the buying of powdered drugs or even to compare the expense of grinding either commercial drugs or those of one's own collecting with that of commercial powdered products, but to consider the qualitative and quantitative investigation of powdered drugs.

QUALITATIVE EXAMINATION.

We are indebted particularly to the labors of Flückiger, Wigand, Vogl, Arthur Meyer, Moeller, Tschirch, Schrenck and others, who, during the past ten years, chiefly have given to us in their publications the characteristic structures of many of our crude drugs. All this has been necessary and is a preparation for the study of powdered drugs. While much has been done, even in the study of powdered products, there still remains much to be done in the study of both crude (particularly American) and powdered drugs. Several things are necessary for the study of powdered drugs:

(1) Suitable methods for the rapid discrimination and study of the characteristic tissues and contents of the powder. While sections of the fine particles can be made (by holding the particle between the forefinger and thumb and drawing the razor through the specimen), still this is laborious and requires considerable practice, time and confidence. It is, therefore, necessary to devise means and employ reagents which shall make the specimen transparent and not destroy either the tissues or contents that need to be seen. The most satisfactory reagent for general purposes in the hands of the writer has been the employment of the following solution:

CHLORAL-GLYCERIN SOLUTION.

Glycerin (C. P.) } equal parts.
Distilled water }
Chloral—sufficient to saturate the solution.

A few drops of this solution are placed on the slide and from 0·002 to 0·008 gramme of the powder added. The cover-glass is put on the specimen and the preparation is heated gently over either a spirit lamp, gas flame or oil lamp until it begins to boil. This is then allowed to cool and examined. If not sufficiently transparent it is heated again. This is generally not necessary, as with but one heating the tissues are transparent and contents may be examined. It is true that this treatment causes a slight swelling of the cell-wall, and is not applicable in testing for starch; but this reagent has the advantages of clearing the specimen and preventing it, without further treatment, from drying out.

When examining specimens containing starch another solution is used, as follows:

CHLORAL-GLYCERIN SOLUTION + IODINE.

Chloral-glycerin solution—any convenient quantity.
Iodine—a sufficient quantity is added to saturate the solution.

This solution is placed on the slide and the same quantity of powder used as before, but heat is not applied. The starch grains, with all of the characteristic markings, will be brought out and may be studied.

When lignified cells are sought, the powder must first be moistened with a drop or two of the following solution of anilin hydrochloride, and then after a few minutes a few drops of the chloral-glycerin solution may be added:

ANILIN HYDROCHLORIDE SOLUTION.

Anilin hydrochloride	5 gm.
Hydrochloric acid (C. P.)	25 c.c.
Alcohol (95 per cent.)	25 c.c.
Distilled water	50 c.c.

The anilin hydrochloride is dissolved in the alcohol, and to this solution the water containing the hydrochloric acid is added. When this solution is used, of course, crystals of calcium oxalate or calcium carbonate are destroyed.

The author is at present at work upon other solutions having the same principle in their composition as the above; but those mentioned are all that are necessary generally, and have been used with success.

(2) All investigators should record the size of the tissues or their contents in microns. The length of bast or wood fibres, size of pores, crystals, starch grains, stone cells, etc., are all more or less characteristic for the drugs we have to consider. It is not sufficient to say that drawings were made by the use of a $\frac{1}{8}$-inch objective and a 1-inch ocular. The objectives and oculars of the various makes of microscopes not only magnify differently, but the question of tube length is also important in this connection. But even if all of these data were given, it must be conceded as being tedious to the reader to calculate the size of the elements, which might be so easily done by the author. Even for an investigator to say that his drawings are magnified so many diameters does not give us the true and scientific idea of the elements which the author has seen and we are to use in the study of powdered drugs. We need records in microns of the size of tissues and constituents of drugs from many sources for comparison, so that another investigator may readily get at the facts. This is the only scientific method for the prosecution of this kind of work, and must be rigidly pursued by all.

(3) A scheme for the logical qualitative determination of a powder is necessary. It will be somewhat difficult to work out a scheme that will be of practical benefit, because it is necessary to begin with the consideration of the characteristics of all drugs and adulterants that may be used. It will not be possible, for instance, to separate the leaves from roots, etc., as is done in the study of crude drugs. Many points, such as color, taste, odor, as well as con-

stituents and structural characteristics must be considered. The author is at present engaged in a work having for its object the identification of a powder and quality of it, and hopes to have it completed during the coming year.

(4) Furthermore, it is necessary for all those who have to do with the training of the apprentice, and buying and selling of powdered drugs, to engage in the study of the same until the most satisfactory methods for determining the identification and quality be ascertained. In our educational institutions there is little or nothing being done, apparently, in this direction. It seems that the time is ripe for some time to be given to the study of powdered drugs in connection with that of crude drugs. This will undoubtedly be of the most practical benefit, as powdered drugs are already handled by most pharmacists to some extent at least.

This subject of the investigation of powdered drugs is one of great importance to-day. The older method of teaching pharmacognosy in this country must be supplanted by the new, having for its object the study of the powdered commercial drugs. This knowledge ought to be demanded by our State boards of pharmacy. It is in keeping, too, with the desires of the professional pharmacist, as it will tend to keep out the competing "merchant" and "grocer." Our "pure food laws" will require the pharmacist to know the value of the drugs and foods he sells. This may be required also of the grocer, but he can buy and sell in original packages. The pharmacist is hardly in the same position, as he cannot always dispense in original packages, and he is responsible for the purity of the goods that he possesses and sells. The conscientious pharmacist wants this knowledge, desires stringent examinations and just laws, and will in his everyday dealings live up to what he knows. He has nothing to lose; it is only the incompetent or dishonest dealer in drugs and foods who will suffer.

QUANTITATIVE EXAMINATION.

In a paper presented to the A.Ph.A. in 1894, a preliminary notice of a method for securing approximate quantitative results of the examination of a powder by means of the microscope was given. After a few years of deliberation and some practice the principles of the process are somewhat more satisfactorily developed and the results will be given. Since 1894 the results of several workers—Day

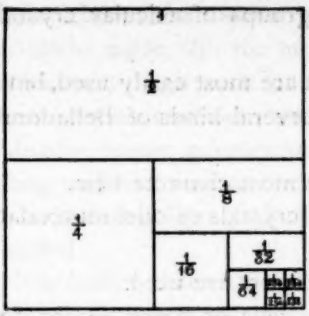
(A.Ph.A. Proc., 1896) and Kebler (AMER. JOUR. PHARM., 1897, p. 244)—as well as the labors of some students during the past year, indicate that the principle of the process suggested is satisfactory, whatever the modifications recommended. The following are the important points embracing the principles of the process as developed thus far:

(1) The same *reagents* and mounting media are employed in doing quantitative work as were considered in the qualitative examination of the powder. In quantitative work, not only some, but *all* of the important characteristic tissues and contents are to be rendered visible.

(2) The quantity of powder to be examined by means of the microscope must represent the sample in every particular; in other words, the *sampling must be done properly* and in accordance with the methods used in the assay of ores. While the quantity to be examined may consist of but a few grammes, it must thoroughly represent the lot of powder on which value is to be given.

(3) The standard powders, with which the powder under investigation is to be compared, must thoroughly represent the drug in the various ways in which it may be treated. The degree of fineness must especially be carefully borne in mind. A sample of a drug of No. 40 powder cannot be compared with one of No. 60. If the sample of a drug to be examined is of a No. 40 powder, the standards must also be of the same degree of fineness. If extraction of active principles is suspected in the powder, it must be compared with a standard that has been extracted. In fact, *every treatment that is possible in a sample to be analyzed must be given to a standard, if possible, with which the comparison is made.*

(4) The amount of powder used in the examination is generally about $\frac{1}{256}$ gramme (= 0.0039 gramme = 0.06 grain). In some cases twice this quantity ($\frac{1}{128}$ gramme) or but one-half this amount ($\frac{1}{512}$ gramme) may be used to greater advantage. The quantity of powder may be weighed out, or, what is more convenient, with practice a gramme is weighed out and divided with a spatula with the eye, as follows:



½ = 0·500 gramme.
¼ = 0·250 "
⅛ = 0·125 "
1/16 = 0·0625 "
1/32 = 0·03125 "
1/128 = 0·0078 "
1/256 = 0·0039 "

(5) The cover-glasses used, whether round or square, *should be uniform in size and thickness* for comparison of the mounts of the standard with those of the specimen to be tested.

(6) The *amount of reagent* employed in making a mount must be just sufficient to float the cover-glass, and as few air-bubbles as possible are permitted to be formed.

(7) *A homogeneous mixture* of powder with reagent must be formed before the cover-glass is put down. This is best done by taking the edge of the cover-glass in a pair of forceps and distributing the powder in the mounting media or reagent.

(8) After the mount has been made and the powder examined previously qualitatively, the quantitative estimation of the powder is determined. This is based on one or more of the structures or constituents that are characteristic of the drug or drugs that may be present. A few examples may be given:

In *Cinchona*, the bast fibres are best selected.

In *Quillaja*, the monoclinic calcium oxalate crystals are most characteristic.

In *Belladonnæ folia*, the pieces of tissues, with some cells containing the characteristic grayish sand-like crystals of calcium oxalate, are selected.

In *Hyoscyami folia*, the pieces of tissues, with some cells containing the characteristic cubical or tetragonal crystals of calcium oxalate, are used.

In *Stramonii folia*, the pieces of tissues, with some cells containing the characteristic "rosette-shaped" crystals of calcium oxalate, are most characteristic.

In *Zingiber*, the estimation is based on the starch grains, or better, the oil-secreting cells.

In *Scilla*, the number of cells with groups of acicular crystals are best selected.

In *Belladonnæ radix*, the starch grains are most easily used, but it must be borne in mind that there are several kinds of Belladonna root in the market.

In *Nux Vomica*, the lignified hairs are most characteristic.

In *Rheum*, the large "rosette-shaped" crystals of calcium oxalate are best selected.

In *Caryophyllus*, the oil-secreting reservoirs are used.

In *Cinnamomum*, the groups of stone cells or starch grains are characteristic, taken in connection with the presence or absence of cork cells.

In *Sarsaparilla*, the starch grains are considered after the kind of root has been ascertained.

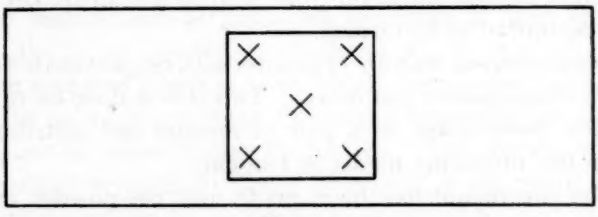


FIG. 2.

In *Glycyrrhiza*, the characteristic fibres with calcium oxalate crystals adjoining them, or the starch grains, are employed.

(9) The method consists in counting the number of characteristic elements in several portions of the slide, and may be performed in several ways:

(*a*) By the use of an ocular micrometer ruled in 100 square millimeters, as proposed in 1894. Five portions, at least, of the mount are examined, as in the places marked X (*Fig. 2*).

The number of characteristic elements that appear in each of these places in certain portions of the ocular micrometer are counted, as, for instance, those that appear in the square millimeters marked X (*Fig. 3*).

The low power (½ to ⅔-inch objective) is used in some cases, as in the estimation of rheum, scilla, etc.; but in most instances, especially when starch grains are to be counted, a higher power (¼ to ⅛-inch objective) is preferred, as in Belladonnæ radix, Zingiber, etc.

(*b*) While these ocular micrometers ruled in square millimeters are easily made, still the makers of microscopical accessories charge such a very high price for the same that it has been found desirable to devise another way for doing the same kind of work. An ordinary ocular micrometer divided into tenths of millimeters is taken, and the number of elements between the outer portions, ruled to a less number of divisions (as those marked X, *Fig. 4*), are counted.

It is better, when using this ocular micrometer, to turn the latter around 180° after counting in the one direction, and counting again. In other words, an additional count is made, *i. e.*, ten are made upon each mount.

(*c*) There are some cases when it is not desirable to use either (*a*) or (*b*), as when the elements or tissues are so large that it is more practicable to exclude the ocular micrometers, and to count all of the tissues or constituents as they appear in the whole field of view of X in *Fig. 1*.

The low power (⅔ to ½ inch) may be used sometimes, as in the

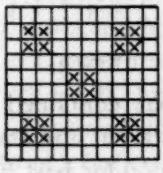


FIG. 3.

estimation of cinchona, quillaja, glycyrrhiza, etc., while in other drugs, as Hyoscyami folia, Belladonnæ folia, etc., a higher power (¼ to ⅛) is used.

(10) *The number of mounts* to be made of the standard and the powder under examination should generally not be less than twelve each. But as two to three mounts can be made upon the same slide, from four to six slides only are necessary for each powder.

(11) If the powder is found to be a mixture, a similar compound, representing the proportions found, should be made up, and the powder under investigation be compared with it.

(12) It is apparent that the quantitative results are purely comparisons of an unknown with a known powder. The conditions must be nearly the same in both. The sampling must be done similarly; the same amount of powder must be used in both, and

no more reagent or mounting media should be used than is necessary to hold the cover-glass without any air being impinged. The same microscope and powers, as well as other conditions, must be employed to secure even *approximate results*, as this is *all that can be expected at present.*

It would be useless for the author to record some of his standards and results; but it no doubt will be profitable to give the records of one or two instances where a number have worked upon the same powder.

STANDARD OF NUX VOMICA.

No.				Hairs.
1.	Mean of	10	readings	12
2.	"	8	"	12⅓
3.	"	10	"	10·9

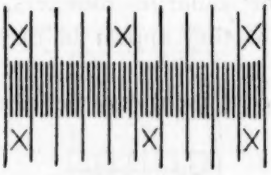


FIG. 4.

A sample of cinchona, that contained 75 per cent. of cinchona and 25 per cent. of wheat starch, was assayed by the process given under 9 (*b*) for starch and 9 (*c*) for bast fibres, and gave the following results to nine different workers:

No.				Cinchona. Per Cent.	Starch. Per Cent.
1.	Mean of	20	readings	74	23
2.	"	10	"	67	—
3.	"	20	"	82	25
4.	"	12	"	77	28
5.	"	16	"	66	35
6.	"	12	"	77	27
7.	"	11	"	69	23
8.	"	20	"	80	30
9.	"	28	"	75	22
Total	"	149	"	74·11	26·66

Conclusion.—We need more effective work in the qualitative study of powdered drugs, and we have some recent evidences that this will be done in this country.

Approximate quantitative results may be obtained in the examination of unknown powders by the methods given. There are some cases, at least, where the quantitative determinations of admixtures and adulterations, if they are to be determined at all, can be done so only by means of a microscopical method.

It is possible that a microscopical separation of active principles may be effected of both drugs as well as their preparations. This would be the desideratum in quantitative microscopical work. Thus far, the work of the author has been unsatisfactory in this direction, because, while at times results come, still the products disappear as quickly, owing no doubt to microscopic conditions of heat and moisture altering the products formed.

KINOS.[1]

By Joseph Bosisto, C.M.G.

The question whether the place of the official variety of kino, which is now almost unobtainable, can be effectively supplied by others met with in commerce (B.P.C. Blue List, No. 49), is answered from Victoria, Australia, to the following extent. Although the Pterocarpus marsupium, and other species of the natural order Leguminosæ yielding kino, are not known to exist in Australia, yet the natural order Myrtaceæ, which exists throughout Australia, contains many species which exude kinos and some catechus. Those have not, so far (save and except one), been found of commercial value, owing to their sparse solubility in water, and in all other known cheap solvents. This arises from the gum kino not being collected within a few days after its appearance on the outer bark. The extreme bright sunlight of Australia, together with the warm thermal lines existing both night and day, causes it rapidly to degenerate into a degraded bassorin, which is insoluble.

Quantities of such kinos exist throughout Australia, obtainable chiefly from Eucalyptus marginata, E. amygdalina, E. sideroxylon, E. fissilis, and many others. The one I have already indicated is Eucalyptus rostrata, from which is exported annually about two tons of its gum; this is almost entirely soluble in water, and is a true kino. It is mentioned in Squire's "Companion to the B.P.," 1882, and in Martindale's "Extra Pharmacopœia," as gummi rubrum from Eucalyptus rostrata.

[1] *Pharmaceutical Journal*, August 28, 1897.

Eucalyptus rostrata is one of the leading trees in many of the forests of Victoria, and is productive of this kinic substance, which, being unable to force its way through the hard, tough outer bark, lodges itself in treacly form in large orifices or carbuncles between the wood and the bark in such quantities that I have known one and two bucketfuls of the liquid to be obtained by boring a small orifice in the swollen part. This liquid kino, when evaporated in a vacuum pan, is obtained as beautiful ruby-red gum kino entirely soluble in water or spirit. The supply from Australia would be very great if only a remunerative market opened.

ARALIA NUDICAULIS.[1]

By William C. Alpers and Benjamin L. Murray.

Aralia nudicaulis grows abundantly in the New England and Middle States, extending north into Canada, south as far as North Carolina, and west to the Mississippi Valley, selecting principally rich hilly woods. It is indigenous to the United States, not being mentioned in European text-books, and has a number of synonyms, as wild licorice, shotbush, small spikenard, false sarsaparilla, Virginia sarsaparilla, and wild sarsaparilla, the latter being the term more commonly used. While country people know this aromatic herb well under the name of wild sarsaparilla, or simply sarsaparilla, and use it "to purify the blood and cleanse the skin," it has attracted but little attention by the medical profession; its only use in medicine seems to be to serve as an adulterant of the official sarsaparilla, in several lots of which, purchased in the New York market, the writers have discovered it.

The late Professor Bastin examined Aralia nudicaulis microscopically, and published the results of his examination in *The Western Druggist*, Vol. VII, 1885, p. 314. This is the only literature that the writers were able to find on this interesting plant, and a chemical examination of its rhizome was probably never made before. There is a slight difference in the description of the leaves and the rhizome between Bastin's paper and ours, which suggests the idea that possibly the Western species varies from the Eastern, Bastin having collected his specimens in the vicinity of Chicago, while

[1] Read at the annual meeting of the American Pharmaceutical Association, August, 1897.

ours were gathered near New York. Bastin, for instance, says that the rhizome will reach a length of from 3 to 5 feet, and Gray, in his text-books, makes the same statement, while we have hardly found any rhizome shorter than 5 feet, and have a specimen here of 29 feet. The description of the leaves also shows some points of difference, the leaves of our specimens being more divided than the ones that Bastin describes. This latter observation was also made by Professor A. C. Apgar, who proposed the name of *Aralia nudicaulis prolifera* (*Bull. Torr. Bot. Cl.*, 14: 166, 1887) for the species found in New Jersey, while Professor N. Britton, in his "Illustrated Flora," calls this kind "a mere form."

BOTANY.

Aralia nudicaulis belongs to the order Araliaceæ, and shares with the other members of the order the warm, aromatic, almost pungent, taste of some parts, principally the rhizome. Early in the spring a petiole and a scape grow near each other from the rhizome, which lies from 1 to 4 inches under the ground, and only rises occasionally a little above the soil. The straight petiole, swollen at the base, rises from 8 to 18 inches high and divides into three

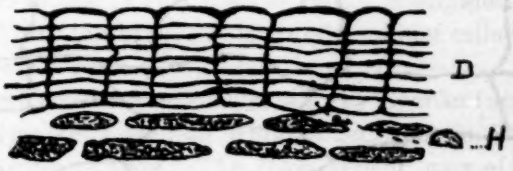


Fig. 1.—Corky layer of old bark, cross-section.

divisions, which at this point of divergence thicken like the base of the main petiole; each division bears a compound leaf of from three to five leaflets. Occasionally one of the lower leaflets is again compound. The leaflets are from 2 to 5 inches long, and from 1 to 2½ inches wide, pinnate with one terminal one, the lower pair on short petioles, the upper one mostly sessile, oblong-ovate, one of the lower ones occasionally almost round, acuminate, finely serrate, smooth on both surfaces. The scape is a few inches shorter than the petiole, and therefore, together with the flower, or later, the fruit, hidden under the spreading leaves. It has neither leaf nor bract, hence the name nudicaulis, and bears from three to seven

small, simple umbels, each consisting of from five to twenty-five greenish flowers. Occasionally there is one or more odd flowers, with rather long stalks growing at right angles out of the scape below or between the umbels. The flowers are perfect or polygamous, with both fertile and sterile ones on the same plant. The calyx is destitute of lobes or teeth; the petals, stamens, and styles are five in number. During the summer a dark purple, nearly black, drupe develops about one-fourth of an inch in diameter. This fruit is probably a welcome food for birds, as it disappears soon after ripening, and can only seldom be found on the ground under the

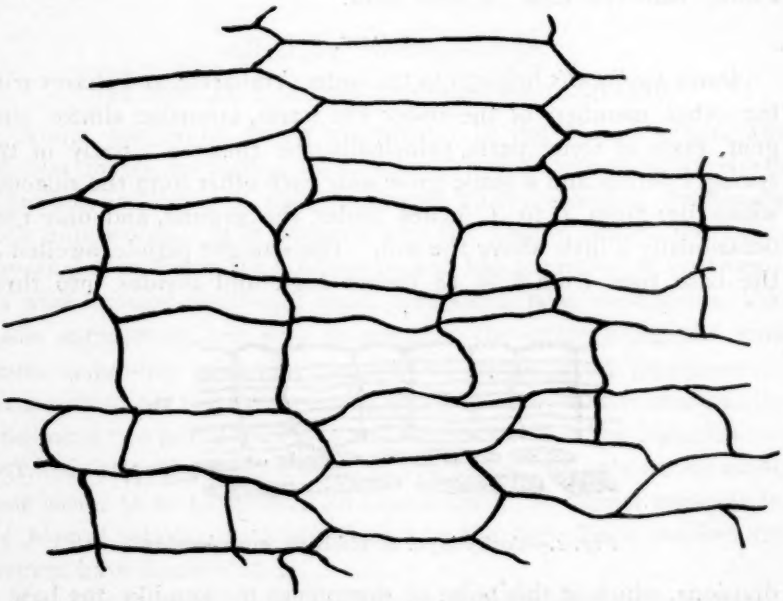


Fig. 2.—Outer bark, longitudinal section.

leaves. It does not seem to serve for the propagation of the plant, the creeping root-stock performing this function.

The most interesting part in which the peculiar aroma of the plant is best noticeable is the rhizome. It grows horizontally and spreads very quickly over a large area, reaching a length of more than 25 feet, branching abundantly and producing small hairy rootlets rather sparingly. The parts of the rhizome that rise out of the soil harden and afterwards die off, producing by their decadence two new growing plants in place of one. The rhizome is nearly

cylindrical, with many concave leaf-scars, corresponding in shape to the swollen end of the petioles. The outer, very thin, grayish, somewhat glossy layer of the bark is easily detachable, and the lower, thick, fibrous layer can readily be peeled off the white or slightly yellowish wood, as long as the rhizome is fresh and moist. A white and spongy pith forms the interior of the wood. On drying, the rhizome becomes wrinkled and brittle, and is from ¼ to ½ inch in diameter. The taste of the fresh rhizome is peculiarly aromatic, similar to that of ginseng, leaving no bad after-taste.

MICROSCOPY.

A cross-section of a segment of the rhizome shows under the microscope three distinct parts, the pith, the wood and the bark. The pith consists of rather large, granular cells, containing starch with occasional crystals of oxalate of calcium.

The pith is surrounded by a wood zone which varies in thickness according to the age of the specimen. In old rhizomes the wood is about twice as thick as the bark, while in very young specimens a cross-section shows a large pith, a thick bark, and very little wood.

The thick-walled woody edges of irregular size are separated by medullary rays of one or two rows of cells. Sometimes these rays are prolonged into the bark. A layer of cambium cells in a double row surrounds the wood.

The bark consists of a fibrous layer, a corky layer and an epidermis. The parenchyma cells are rich in starch and contain, like the pith, crystals of calcium oxalate. The characteristic part of the fibrous layer of the bark is the great number of oil or resin cells, the largest cells of the plant, resembling tubes that can often be traced quite a distance in longitudinal sections. They are intrenched by a wall of small cells that undoubtedly secrete oil and resin, while the large inner cells serve as reservoirs. The medullary rays often extend into this layer, taking an irregular, somewhat tortuous course, and sometimes their two rows of cells separate and encase one of these large oil cells. The resin is probably held in solution by the oil. Between the fibrous and corky layers of the bark, a double row of peculiarly shaped cells are observable, probably a layer of phellogen.

The corky cells are empty and rather large, presenting no points of particular interest. A thin epidermis covers the corky layer, easily detachable and often wanting.

CHEMISTRY.

Samples of Aralia nudicaulis were gathered in the fall in the hilly woods in Bergen County, N. J., and most of the chemical examinations were made on these samples. A further supply was collected in the following spring, when the flowers of the plant were in bloom.

The general plan of the work was:

(1) To determine the presence or absence of alkaloids or glucosides.

(2) To determine the presence of other important constituents.

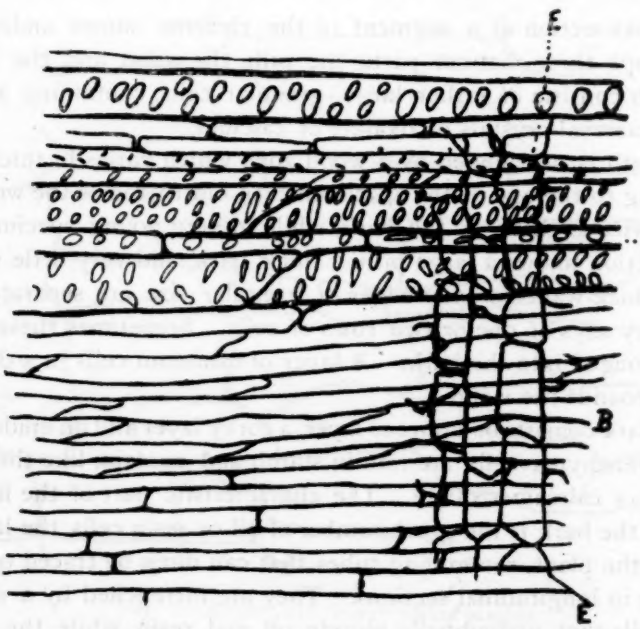


Fig. 3.—Wood, from pith to bark, longitudinal section.

(3) To undertake a systematic analysis and estimation of the constituents.

For the first part of the work, testing for alkaloids and glucosides, samples of the drug gathered in the fall as well as in the spring were finely ground and digested for three days in a closely stoppered flask with Prollius' fluid. After filtering, the liquid was treated with acidulated water (sulphuric acid 1 part, water 5 parts) and the aqueous liquid submitted to examination. Wagner's reagent, tannin,

picric acid, platinic chloride, sodium phospho-molydate, and Mayer's reagent, gave no precipitate. All the tests were repeatedly verified by using larger quantities of acidulous solutions.

For the further determination of important constituents, together with alkaloids and glucosides, the following experiments were made:

Large samples of the finely ground rhizome of the plant, gathered both in spring and fall, were digested in benzene for three days. After filtering and evaporating to dryness, a yellowish-brown, resinous mass was obtained. This residue was treated with warm water, filtered and tested for alkaloids, glucosides and organic acids. The still insoluble residue was treated with acidulous water, and this acidulous liquid tested like the preceding one. The reagents applied were salts of lead and calcium, tannic acid, Wagner's reagent, platinic chloride, gelatin solution, and Fehling's solution. No reaction was obtained, except a slight change of color in Fehling's solution. To still further verify the above results and avoid the uncertain action of water upon the resinous matter, which became soft with heating, another benzene extract was made and treated directly with water and then with acidulated water. These aqueous solutions caused no new changes, the color of Fehling's solution alone being affected.

Tests for tannin were then made. A finely ground sample of the drug was digested with a good grade of absolute alcohol and the liquid filtered. This alcoholic liquid caused a slight reduction of Fehling's solution, and likewise precipitated a solution of gelatine, starch paste, and antimony and potassium tartrate. A solution of potassium hydrate was darkened, a solution of potassium permanganate reduced in about two minutes, solution of silver nitrate reduced, and a solution of ferric chloride rendered green. Confirmatory tests were made on two additional samples of the drug, in both cases with the same result. The same reagents were also applied to the alcohol alone, used for digesting, without showing any reaction. The presence of a small percentage of tannin was therefore determined.

The residue of the drug left in the experiment mentioned above, after treating the Aralia with absolute alcohol, was washed thoroughly with more absolute alcohol, dried, and then digested twenty-four hours in cold water. The aqueous liquid after filtration was of

brown color. Upon application of heat it reduced Fehling's solution and precipitated with a solution of basic acetate of lead, with a solution of borax, with alcohol, and with ether. With a solution of ferric chloride in the cold it caused no precipitate. The presence of mucilaginous matter was thus shown.

As the next experiment, a sample of coarsely cut Aralia nudicaulis was distilled with steam, the distillate showing the presence of an agreeable-smelling volatile oil. The liquid comes over milky,

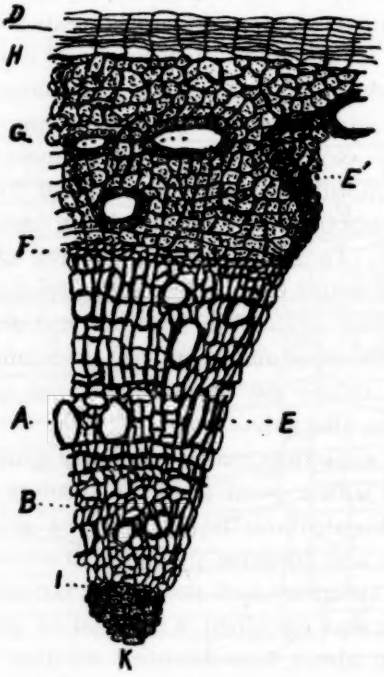


Fig. 4.—Entire rhizome, segment, cross-section.

A, pitted vessels; *B*, lignified cells; *D*, cork cells; *E*, medullary rays; *E'* medullary rays, prolonged into bark; *F*, cambium layer; *G*, resin and oil cells; *H*, phellogen; *D* to *F*, bark; *F* to *I*, wood; *I* to *K*, pith.

and oily globules soon collect, floating upon the surface. The microscopical examination had already revealed that this oil resides in the bark of the rhizome, and upon distilling some of the fresh bark alone, without the wood and pith of the rhizome, quite appreciable quantities of oil were found.

Whether the rhizome gathered in the fall contains more or less

volatile oil than the spring drug has not been determined; our impression, based on the odor and taste of the samples of various seasons, is, however, that the oil is more abundant in the fall than in the spring. In working with the fresh bark alone the distillate became more milky and the oil-drops solidified at about 20° C., showing a light yellow color. Further investigations of this oily portion led us to believe that some of the resins present in the plant were carried over in the distillation, though precautions were taken against it. The odor of the oil is persistent and gives the drug its characteristic smell, noticeable even in the air of places where the plant grows abundantly.

After having determined the absence of alkaloids and glucosides, and the presence of tannin, starch, volatile oil and resins in the rhizome of Aralia nudicaulis, examinations were made for some of the more important constituents according to Parson's scheme. At a temperature of 98° to 100° C., the drug lost 6·50 per cent. of moisture, and the dry sample, on which all future percentage calculations were based, contained, on incineration, 5·47 per cent. of ash. This ash yielded 24·82 per cent., equal to 1·36 per cent. of the original dry sample, of soluble matter, consisting of chlorides and sulphates of sodium and potassium. The drug yields to chloroform 3·38 per cent. of a soft, brown, resinous and oily matter. This chloroformic extract was dried for two months over sulphuric acid without hardening. At a temperature of 110° C., it suffered a loss equal to 0·33 per cent. of the original dry drug, which amount represents the volatile oil present. Subsequent estimations of this oil were not successful.

After the treatment with chloroform, the residue was exhausted with 80 per cent. alcohol, yielding 8·75 per cent. of brown resinous matter, of which 6·66 per cent. was ash. The portion of this alcoholic extract, soluble in absolute alcohol, and again soluble in water, forming neutral solutions, gives tests with the following reagents for tannin: Basic acetate of lead—light yellowish precipitate; gelatine, starch, potassium and antimony tartrate—precipitates; potassium permanganate, silver nitrate—reductions; ferric chloride—green color. Further examination of this extract, omitting confusing details, shows the presence of acid resins and indications of neutral resins. An organic acid is also present.

After the chloroform and alcohol extractions, a water extract was

made, yielding 3·58 per cent. of the dry Aralia, of which 24·36 per cent. was ash.

The next extraction, made with an acid menstruum of 1 part of sulphuric acid and 5 parts of water, yielded 56·10 per cent. with 11·67 per cent. of ash.

The final extraction, with an alkaline menstruum, yielded 6·89 per cent.

As a summary the following table is presented:

Extract with	Percentage of dry drug.	Containing
Chloroform . . .	3·38	Resin, 3·05 per cent.; oil, 0·33 per cent.
Alcohol, 80 per cent.	8·75	Tannin; organic acid; acid resin (neutral resin?).
Water . . .	3·58	Albuminous bodies; coloring matter.
Acid $\frac{1}{5}$, water $\frac{4}{5}$ . .	56·10	Mucilaginous matter.
Alkaline solution .	6·89	Crude fibres, etc.
(By subtraction) .	21·30	Cellulose.
	100·00	

Further investigation will be conducted, especially on the oil and resins in which the active medicinal properties seem to resicde.

PHARMACEUTICAL PREPARATIONS.

A quantity of the fresh rhizome of *Aralia nudicaulis*, gathered in the fall, was digested with alcohol, according to the directions of the Pharmacopœia for making fresh tinctures. This tincture, Tinctura Araliæ Nudicaulis Recentis, after standing nearly a year, exposed to the varying temperatures of winter and summer, showed no precipitate, and possessed the odor and taste of the plant in a marked degree. Mixed with water it forms a milky precipitate indicating the presence of oil and resin. It has a beautiful gold-yellow color which seems to be permanent. A fluid extract was prepared from the rhizome gathered in the spring. A menstruum of 4 parts of alcohol and 1 of water was used, and the general directions of the Pharmacopœia for making fluid extracts were followed. The evaporization of the second percolate was performed at a very low temperature, in order not to drive off oily or resinous parts. The fluid extract resembles the tincture, but is darker,

owing to the solution of the coloring matter of the plant, and is more aromatic.

Although this fluid extract appears to be an elegant and highly concentrated preparation, and to possess all the properties of the drug, it is doubtful, in the writers' minds, if therapeutically it would be the most desirable form of administering the drug. If the virtues of the drug depend, as we believe, on the oil and resins, the separation of these constituents, if possible, seems to be the most advisable step. The properties of the drug, judging from some crude experiments, seem to be stimulant, diaphoretic, and probably neurotic.

THE IMPORTANT CONSTITUENTS OF TARAXACUM ROOT.[1]

By L. E. Sayre.

According to the promise made at the meeting of this Section last year, the investigation upon Taraxacum has been continued. It was begun, not without considerable misgiving, but with the hope that some process for crystallizing the bitter principle would be found, so that a more accurate study of its chemical and physical properties could be accomplished, and that a method of accurately standardizing this much-used drug could be furnished.

Briefly summarizing the work of which this is a continuation, it will be seen, by referring to the papers previously published in the Association Proceedings,[2] that the following constituents, among others less important, have been identified: (1) A resin soluble in chloroform and ether, insoluble in alcohol; (2) A resin soluble in alcohol; (3) Taraxacerin, a white, waxy substance, separating from alcoholic solution in cauliflower-like forms; (4) A bitter principle, which, in somewhat concentrated solution, is precipitated by a number of alkaloidal reagents. Solutions containing the seemingly pure principle, when evaporated, produced a film which, under the microscope, revealed oftentimes crystals of acicular form mixed with globules of oleoresinous appearance. When this mixture was treated with oxidizing agents—even by hydrogen peroxide—it was gradually converted into a crystalline mass, which proved to be oxalic acid. Attempts to separate the crystals found in the unoxi-

[1] Presented at the meeting of the American Pharmaceutical Association, 1897.

[2] See Proc. A. Ph. A., 1896, p. 160.

dized evaporate were unsuccessful. To decide whether these crystals or the oily globules were the bitter principle, or whether the one was derived from the other, was little more than a conjecture. Slow evaporations of chloroformic, ethereal, alcoholic and aqueous solutions failed to produce crystals free from oleoresinous globules. Evaporation of aqueous solution in vacuo was no more successful.

The work was begun this year by making an ultimate analysis of taraxacerin. Slowly evaporating its impure alcoholic solution, the cauliflower-like crystals separated as stated in paper of last year. The taraxacerin thus freed from extraneous matter was collected, dried over sulphuric acid, and a number of combustions made. The result of these combustions will be subjoined to this paper. A quantitative analysis of the inorganic constituents of taraxacum root will also be appended.

For the further investigation of the bitter principle an extraction of taraxacum root was made for me by J. U. Lloyd, as follows: Forty pounds of the powdered root were percolated with chloroform, and the dregs were then exhausted with alcohol. The chloroformic and alcoholic tinctures were separately distilled, leaving behind in each case a residue of thick, syrupy consistence. These syrupy extractives were used as a starting point for the further investigation of taraxacin and other constituents.

Taraxacin, Bitter Principle.—Further efforts have been made to bring the bitter principle to the crystalline form. Thus far these efforts have been only partially successful; a detailed description of this work is unnecessary. Suffice it to say for the present, acetone as a solvent seems to promise some aid in its isolation. An acetone solution of the yellowish, amorphous, viscid and extremely bitter extractive (corresponding to crude taraxacin) was made. On slowly evaporating this solution, a thin, syrupy, transparent film was left which contained imperfectly formed stellar crystals—tufts imbedded in viscid media. On adding a drop of water, the film and crystals immediately broke down into yellowish oleoresinous-like globules. The most satisfactory method thus far employed for purifying this principle is to dissolve the crude principle (extractive) in 20 per cent. alcohol; treat this with specially purified animal charcoal until the solution loses its bitterness; carefully wash the carbon with water; dry, and treat it with boiling alcohol; evaporate the alcoholic

solution at a low temperature, and dry the residue over sulphuric acid. This has, however, the disadvantage of being a wasteful process. The dried product dissolved in acetone behaves as stated above.

Although the crystallization of taraxacin at present seems almost impossible, it has not been given up as hopeless.

Analysis of Taraxacerin.—The result of the combustion of this principle may be here stated. Several combustions were made, but only three recorded; of these three, the second and third seemed to be the most reliable. A tabular statement of the percentages is as follows:

	1.	2.	3.
Carbon	77·36	77·16	77·32
Hydrogen	11·55	11·13	11·13
Oxygen	11·09	11·71	11·55

Mean of 1, 2, 3:		Mean of 2 and 3:	
C	77·28	C	77·24
H	11·27	H	11·13
O	11·45	O	11·63

Reducing the percentages of the last table, the following amounts appear:

$$C = \frac{77{\cdot}24}{11{\cdot}92} = 6{\cdot}4803 \qquad \frac{6{\cdot}4803}{{\cdot}7324} = 8{\cdot}85$$

$$H = \frac{11{\cdot}13}{1} = 11{\cdot}13 \qquad \frac{11{\cdot}13}{{\cdot}7324} = 15{\cdot}20$$

$$O = \frac{11{\cdot}63}{15{\cdot}88} = {\cdot}7324 \qquad \frac{{\cdot}7324}{{\cdot}7324} = 1{\cdot}00$$

Taraxacerin would therefore correspond to the empirical formula $C_9H_{15}O$, or a multiple thereof.

The melting point of this substance was about 45° C. Its chemistry will probably be worked out in detail in the future. For aid in this work in combustion I am especially indebted to Mr. W. M. Whitten, Assistant in Chemistry of the Kansas University, who promises in the future to aid in its further study.

Inorganic Constituents of Taraxacum Root.—Ash in dried root (dried at 100° C.), 11·13 per cent.

CONSTITUENTS OF ASH.

	Per cent.
SiO_2 and sand	43·27
Al_2O_3	18·07
Fe_2O_3	0·80

	Per cent.
CaO	5·75
MgO	6·60
K_2O	13·83
SO_4	4·22
P_2O_5	trace.
CO_2	6·53
Cl	1·20
Total	10·027

This latter work was performed by Mr. C. M. Palmer, a senior student of the School of Pharmacy.

The examination of the chloroformic and alcoholic extractions was carried beyond the report made in this communication, but the interesting work is not yet completed, and will be made the subject of another paper at the coming meeting of the society.

RECENT LITERATURE RELATING TO PHARMACY.

SYNTHETIC REMEDIES.

Lactophenin, according to Dr. George Thompson (*Universal Medical Journal*, August, 1897), possesses several advantages over phenacetin. As is well known, lactophenin is a definite chemical compound, differing from phenacetin by containing lactic instead of acetic acid. The substitution of lactic acid, it is claimed, overcomes almost entirely the possibility of cardiac depression or the conversion of hæmoglobin into methæmoglobin, an attribute only too frequently met with in antipyrin, acetanilid and phenacetin. As an analgesic it is equal, according to the author, to the best pain reliever in the materia medica, and it may be given with confidence in neuralgia from any other cause than traumatic.

Thiol has been found by Dr. Wirz (*Deut. Med. Wochenschrift*, July, 1897) to be superior to ichthyol in some hundreds of cases. It is odorless, so that patients who could not bear the odor of ichthyol improved under thiol. It can be used in every description of inflammation, in carbuncles, erysipelas, typhilitis, furunculosis, etc. The best results are obtained with liquid thiol as supplied by the manufacturers, not by that prepared from powdered thiol with an addition of water.

EDITORIAL.

READ BY TITLE.

The custom of reading papers by titles before the sections of the American Pharmaceutical Association is a growing one, and, at the same time, it is one much to be deplored. For what purpose is a paper presented to a scientific body unless it be for the discussion? The matter of publication is a secondary one; for, if valuable, the paper finds its way into print rapidly enough, either in part or in abstract. From the journals in which it appears it is copied by foreign periodicals, and thus it becomes distributed over a large part of the world. Except for purposes of reference, the paper has served its purpose long before the bulky Proceedings appear. If, for any reason, the title is the only accessible part of a paper at the meeting, and thereby the journals fail to print it, it takes a short cut to oblivion; for neither journals nor individuals ever attempt to do anything with papers after they appear in the Proceedings; they are considered stale by that time, and certainly foreign journals never abstract from such a source; they would be pretty sure to be reprinting old matter, and avoid it.

At the recent meeting of the American Pharmaceutical Association, over twenty papers were presented to the Scientific Section, yet something like half of these were read by title and passed on to obscurity. Some others were crowded into the Section on Education and Legislation, and one has appeared *in full* in at least one drug journal as having been presented, which was only read in abstract by the author, he having decided, after reaching the meeting, to withhold part of it for one year.

Presumably the sessions of the Association lasted a week. The work, however, was condensed into parts of five days; still there was, apparently, not time to read and discuss the papers presented to the two sections, amounting to something over thirty. It has been said that this was due to an accident, whereby certain social features occurred concurrent with the sessions of the Scientific Section, but such accidents occur almost every year. Members must naturally ask themselves whether attendance at the American Pharmaceutical Association is to listen to and discuss papers or to take trolley rides. In the case referred to, the members elected in favor of the trolley, and the work which was mapped out for three sessions was crowded into one and continued past the midnight hour, with everybody tired out after a day of sightseeing. Naturally, the man who travelled 1,000 or 2,000 miles to attend the meeting was disgusted.

The fact has been deplored that the retail pharmacist is every year becoming more conspicuous by his absence from the meetings. He attends the sessions for the purpose of learning something that will be of value to him in his business. In what part of the programme will he find it? Certainly not in that devoted to social features.

The real earnest members are not unreasonable in requesting that no social features be introduced until all the business has been transacted, or else that there be no simultaneous meetings for business and pleasure. Papers should be in the hands of the chairman of the section to which they are to be presented, at least ten days before the meeting, and an abstract only should be read by the author; this would help to do away with the custom of some

authors of writing their papers on the way to the meeting. It is safe to say that the author who is so terribly pushed for time as to be compelled to call in the services of a stenographer and typewriter after he reaches the place of meeting, is not going to produce anything that will prevent the section from disintegrating into a trolley party, if such an opportunity occurs.

A COMPARISON.

The editor of the *Pharmaceutical Journal* has expressed a fear that our remarks in the August number on the ability of the British Pharmaceutical Conference to transact a large amount of scientific work in a short time were sarcastic rather than complimentary, and we are desirous of assuring him that he may interpret in favor of the Conference. The assertion was made with a comparison in mind, which has been made during the past several years, while the two great English-speaking pharmaceutical bodies have been holding their annual meetings. The developments this year at Minnetonka still more emphasized the difference in the manner of conducting the two associations. At Glasgow the Conference lasted three days, the last of which was devoted to pleasure-seeking, and seventeen papers were read and discussed. The report in the *Pharmaceutical Journal* does not record that any were read by title; one, making eighteen in all, arrived from Australia too late for the meeting, but was accepted by the Publication Committee. At Minnetonka five days were set down for business, and two more, with Sunday, for pleasure; about thirty papers were disposed of, many of them being merely read by title, and discussion was much curtailed on the others. Certainly no sarcasm can be found in our remarks after making this comparison.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

SUR UN STROPHANTHUS DU CONGO FRANÇAISE.—Par MM. les professeurs Schlagdenhauffen et Louis Planchon. Reprint from *Annales de L'Institute Colonial*, Marseilles. 1897.

The authors studied this new species because they believe that strophanthus will be an important medicine of the future, and because every new variety of such a valuable remedy, which appears in commerce, should have its fitness for medicinal use established. From the several botanical characters clearly shown in the beautiful illustration which accompanies the contribution, the authors feel justified in declaring this to be a new species, which they have designated Strophanthus d'Autran, after the botanist who collected it.

In Chapter I the fruit and seed are described, and the anatomic differences between this and other species illustrated. Chapter II is devoted to the chemical analysis of the fruit and seed; and Chapter III describes the physiological action of the several commercial species compared with the new species, and their influence on the heart action of a frog is illustrated.

The conclusions reached are that there is a close resemblance, chemically, between the new species and the Strophanthus hispidus, analyzed by Fraser, and that the physiological actions of S. Kombé, hispidus, glabre, Zambése and d'Autran are identical.

The whole is a creditable piece of research work, which, in view of the growing popularity of the drug, is worth the while of pharmacognosists to study.

ANNIVERSARY ADDRESS before the Royal Society of New South Wales, by the president, J. H. Maiden, Government Botanist and Director of the Botanic Gardens, Sydney, May 5, 1897.

This comprehensive pamphlet of sixty-nine pages is composed as follows: "History of the Society during the past year," "Progress of Science in New South Wales during the past year," "Some Botanical Mâtters," "Forestry, etc.," "Australian Timbers," "Botanical Teaching in New South Wales," "A Plea for a Botanical Survey."

Under botanical matters, a fitting allusion is made to the life work of the late Baron von Mueller. Every part of the address contains valuable information about Australia.

CONTRIBUTIONS FROM THE U. S. NATIONAL HERBARIUM, Vol. V, No. 3. STUDIES OF MEXICAN AND CENTRAL AMERICAN PLANTS. By J. N. Rose, Washington, 1897.

The similarity in the flora between the Southwestern United States and the regions covered in the above contribution makes this number of considerable interest. The illustrations are numerous and well executed.

AGE OF TREES AND TIME OF BLAZING DETERMINED BY ANNUAL RINGS. By B. E. Fernow, Chief of Division of Forestry. Circular No. 16, issued by the U. S. Department of Agriculture, Division of Forestry.

The author is a firm believer in the method of determining the age of trees by counting the annual rings; indeed, it is difficult to understand how there can be any controversy on the subject. Mr. Fernow, after a close study of the objections, has written a clear and concise account of how to overcome the difficulties. The part devoted to the covering of blazes, wounds and knots is also valuable. The circular is remarkably well illustrated.

CIDER VINEGARS OF PENNSYLVANIA. By Dr. William Frear, Bulletin No. 22, of the Pennsylvania Department of Agriculture.

While much of this report is especially of value to the farmer in determining the value and ripeness of his product, still the chemist, after reading it, cannot but be better prepared to identify a true cider.

SALICYLIC ACID AND CALCIUM SULPHITE AS PRESERVATIVES OF CIDER. By E. H. S. Bailey and Chas. M. Palmer. From the Kansas University Quarterly, Vol. VI, No. 3, 1897.

BULLETIN OF THE BUSSEY INSTITUTION, Jamaica Plain, Boston, Vol. II, Part VI, 1897.

This number is devoted to "Observations on Some of the Chemical Substances in the Trunks of Trees." By F. H. Storer, Professor of Agricultural Chemistry. It is of especial interest because of its record of the investigation of cellulose and closely allied bodies.

MEDICAL BOTANY. By William Trelease, Sc.D., Director of the Missouri Botanical Garden.

Coming from such a source, this contribution should be read with more than

ordinary interest by pharmacists and physicians. The author points out that the study of medical botany of to-day has fallen to the pharmacist to a larger extent than to the medical student; he, however, states that the growing knowledge of bacteria is a necessary branch of medical botany, and that the physician cannot ignore this subject. The paper was originally read before the Section on Materia Medica and Pharmacy of the American Medical Association, at the 1897 meeting, in Philadelphia.

NOTES AND NEWS.

Professor Oscar Loew, who has been professor of chemistry in the Agricultural Department of the Imperial University at Tokio, Japan, for the last four years, has returned to Germany and is again engaged in teaching in the University at Munich. His successor in Tokio is Dr. Bieler, formerly assistant in the Agricultural Laboratory at Halle.

The *Flückiger Medal* was awarded by the German Pharmaceutical Association, during its recent meeting, to E. M. Holmes, Curator of the Museums of the Pharmaceutical Society of Great Britain.

This medal is awarded once in five years, for distinguished services in the promotion of pharmaceutical research. In selecting Mr. Holmes as the subject of this honor, the society did credit to itself, and at the same time acknowledged the eminent worth of a man whose researches have been so numerous and productive of results that if the titles alone were given they would fill some pages of this JOURNAL.

Citric acid by fermentation of carbohydrates is claimed by German patent No. 72,957, April 5, 1893, and species of citromyces are especially mentioned as bringing about this fermentation. The patent is now supplemented by a new claim (German patent 91,891), based upon the discovery that the same result may be obtained by means of Mucor piriformis. The latter fungus is found on putrefying fruit, especially on pears and apples; its spore carriers only grow in a moist atmosphere, and form long, white filaments, terminated by brownish-black heads. It can readily be obtained in pure culture by sowing the spores in a suitable medium, such as sugar solution, beer wort, steamed rice, starch paste, etc., the ordinary room temperature being favorable for its growth. The solution becomes acid from the formation of citric acid.—*Jour. Soc. Chem. Industry*, June 30, 1897.

The Bile of Serpents is found by Professor Fraser to have the power of neutralizing serpent venom, whilst ox bile has the same property in a lesser degree. This neutralizing action is manifested to a wonderful degree when the bile is injected along with the venom, and to a less extent when it is injected after the venom. In a paper treating of this subject, read by the Professor before the Royal Society of Edinburgh, on Monday, July 5th, he stated that he had separated the water-soluble part of the bile from the alcohol-soluble part, and found it quite equal to the best antivenene in its immunizing effects with regard to serpent venom. These are very interesting results of the investigation upon which Professor Fraser has been engaged so long, and it is to be

hoped that they may prove capable of practical application.—*Pharm. Journal*, July 17, 1897.

Ginseng is one of Corea's most valued products, and during 1896 realized some £30,000. For centuries past red ginseng has gone to Pekin with the annual overland embassy, the trade in ginseng being a royal monopoly, from which the King of Corea derived a considerable portion of his revenue, and its export by sea was prohibited. In November, 1895, however, an ordinance was promulgated legalizing its export, the king receiving compensation by an addition to his privy purse, which now stands at some £60,000 a year. The annual crop of ginseng is limited in quantity to about 15,000 catties, upon which an excise duty of $10 a catty is charged under the new regulations, to which is added an import duty of 5 per cent. *ad valorem*, levied on its arrival at a treaty port in China. The prescribed scale of taxation is not rigidly adhered to, and there is reason to believe that in practice the amount raised exceeds considerably 15,000 catties.—*Pharm. Jour.*, August 7, 1897.

A Monument to Pelletier and Caventou has been proposed in Paris, and the following committee has been appointed:

Honorary President, M. A. Chatin.
President, M. Planchon.
Vice-Presidents, MM. Moissan and Marty.
General Secretary, M. Bêhal.
Assistant Secretary, M. de Mazières.
Treasurer, M. Bocquillon-Limousin.

The committee feels justified in calling on all those who have been benefited by the discovery of Pelletier and Caventou. These scientists gave to the world, unencumbered by trade-mark, patent or any other reservation, one of the greatest of remedies—quinine. It is proposed to erect the monument in front of the École de Pharmacie de Paris. The address of the Treasurer is 2 bis, Rue Blanche, Paris.

The thirteenth annual meeting of the *Minnesota State Pharmaceutical Association* met at Lake Park Hotel, Lake Minnetonka, August 23d and 24th, with thirty-five members in attendance at the opening session, and nearly 100 were in attendance before the meeting closed.

Secretary C. T. Heller, reported 286 members on the roll; lost by death, 5. Treasurer H. W. Rietzke reported a balance of $160. Twenty-five new members were elected at the first day's meeting, and five at an adjourned meeting held August 28th.

The following officers were elected for the ensuing year: President, Fred. Scott, Stillwater; First Vice-President, H. T. Holverson, Alexandria; Second Vice-President, F. W. Finch, Hastings; Third Vice-President, Miss Josie A. Wanous, Minneapolis; Secretary, Charles T. Heller, St. Paul; Treasurer, H. W. Rietzke, St. Paul; Executive Committee, John F. Danek, Minneapolis; A. T. Hall, St. Paul, and A. J. Eckstein, New Ulm.

Committee on National Legislation offered the following resolution, which was unanimously adopted:

WHEREAS, it is customary for the Government to grant a trade-mark or copyright to manufacturers of articles made in foreign countries where said articles are not protected by trade-mark or copyright, thus restricting competition in the manufacture of said articles in this country. Therefore, be it

Resolved, That the members of the Minnesota State Pharmaceutical Association, in convention assembled at Lake Park, August 23d, do earnestly urge the Committee on National Legislation of the A. Ph. A. to see that a bill is drafted and presented to Congress prohibiting the future granting of such copyright or trade-mark for goods manufactured in foreign countries, and not thus protected in the countries where made, and thereby remove the excessive cost on such goods in this country, whereas as the law now stands an alien can introduce articles into this country for four or five times the price in his own country, while our Government hardly receives a cent of revenue.

A committee of three was appointed to formulate a price-mark to be used in marking copies of prescriptions, so that there will be more uniformity of prices throughout the State on prescriptions, the Secretary to be the custodian of the mark, and to be given only to those who will agree to use it.

Meeting adjourned to meet at Lake Minnetonka, June 14, 1898.

OBITUARY.

Professor Dr. Victor Meyer, whose brilliant discoveries in the field of chemical research won for him the esteem and admiration of his fellow-laborers in this branch of science, died unexpectedly at his home in Heidelberg, Germany, August 7th.

He had been suffering from nervous troubles, accompanied by insomnia, brought on, no doubt, by excessive work, and it is sad to reflect that a man of such energy and ability as Professor Meyer should, perhaps, during a temporary aberration of mind, end his own career, as was evidenced by the circumstances connected with his death.

Professor Meyer was born at Berlin, September 8, 1848. He entered the university there in his sixteenth year, but remained only a short time, when he went to Heidelberg, where he devoted himself to the study of chemistry under Bunsen. After graduation at the latter institution he continued his study of chemistry under Baeyer, at Berlin. In 1867 he became assistant to Bunsen, and in 1871 was made professor of chemistry at the Polytechnic School at Stuttgart, and in 1872 at the Polytechnic School at Zürich. In 1855 he removed to Göttingen, and in 1889 was appointed successor to Bunsen at Heidelberg, the latter recommending him for the position. As an instructor he was singularly gifted, and the study of chemistry at Heidelberg received a great impetus through his teachings.

His scientific papers were numerous and covered a wide range of subjects in the domain of chemistry, and it is only necessary to refer to a few of the results accomplished by him to show the importance of his work. Of particular significance was his study on the subject of vapor density; for not only did he devise a method for determining vapor density, which has largely supplanted other methods, but the principles of pyro-chemistry were more thoroughly and clearly established by the results obtained by him at high temperatures. By his discovery of thiophene in benzine, and the subsequent study of its properties and derivatives, he added to organic chemistry an entirely new series of compounds.

In 1893 Professor Meyer was elected an honorary member of the Philadelphia College of Pharmacy.